Getting Started

Sound BLASTER® 32

CREATIVE

CREATIVE LABS

Introduction

Welcome to the next wave of multimedia computing.

The Sound Blaster 32 (SB 32) is an audio card that allows you to obtain realistic acoustic reproduction through digitized sound samples. This card offers 1 MB of sound samples from its onboard ROM. However, for SoundFont editing, as well as GS and MT-32 support, SIMM RAMs are required

Fully Adlib and Sound Blaster compatible, SB 32 supports MIDI standard such as General MIDI and compression algorithms such as A-law, Mu-law, and IMA-ADPCM. In addition, your audio card can be connected to an IDE CD-ROM drive.

Before You Begin

This section provides information you should know before using this manual. It is organized as below:

- Checking the System Requirements
- Obtaining the Latest Information
- Making a Copy of Your Diskettes
- Using This Manual
- Document Conventions

Checking the System Requirements

The system requirements are:

- An 80386 computer or higher, with an EGA or VGA card installed (VGA recommended).
- 11 MB of hard disk space for your audio card's software.
- 4 MB RAM.
- MS-DOS or IBM PC-DOS version 5.x or later.
- Windows 3.1 (enhanced mode) for Windows applications.

Line In Jack

The Line In Jack allows you to connect devices such as a cassette, DAT, or Minidisc player to your audio card for playback or recording.

Microphone In Jack

The Microphone In Jack allows you to connect a microphone for voice input.

Line Out Jack

The Line Out Jack allows you to bypass your card's internal amplifier to connect powered speakers or an external amplifier for audio output

Speaker Out Jack

The Speaker Out Jack allows you to connect speakers for audio output from the card's built-in power amplifier The built-in amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power

Connectors

Connectors are also interfaces on your audio card that allow you to attach other devices to your card But, unlike jacks, connectors consist of many pairs of pins as shown in Figure 1-2

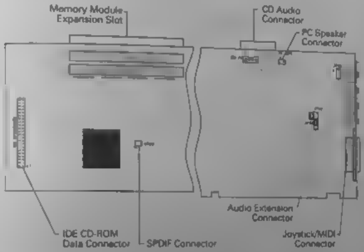

Memory Module Expansion Slot
CD Audio Connector
PC Speaker Connector
Audio Extension Connector
IDE CD-ROM Data Connector
SPDIF Connector
Joystick/MIDI Connector

Figure 1-2 The connectors on your audio card

Joystick/MIDI Connector

The Joystick/MIDI Connector allows you to connect a joystick or MIDI kit to your audio card.

The optional MIDI kit contains a MIDI adapter with a joystick connector so that you can plug in a joystick and a MIDI device simultaneously The kit also comes with a sequencing software that allows you to record, play back, and edit MIDI files.

PC Speaker Connector

The PC Speaker Connector makes it possible to redirect sounds that normally come from the PC speakers to the external speake (see the appendix "Hardware Information").

CD Audio Connector

The CD Audio Connector allows you to connect the audio cable to the CD ROM drive. With speakers connected to your audio card, you can listen to audio from the CD-ROM drive (For more information, refer to the documentation provided with your CD-ROM drive.)

Memory Module Expansion Slot

The memory module expansion slot allows you to insert SIMMs on your audio card A maximum of 28 MB RAM from the SIMMs allows you to have SoundFont editing features, as well as GS and MT-32 MIDI modes.

We recommend that you use a pair of SIMMs with the same capacity. The SIMM RAM access time must also be 80 nanoseconds or faster.

SPDIF Connector

The SPDIF Connector is an interface that allows you to transfer digital audio signals from recorder to recorder. In this way, the fidelity of a transferred digital signal is preserved. You can transfer these signals from your audio card to a recorder only through the SPDIF (Sony/Philips Digital Interface Format) Connector. Refer to the "Hardware Information" appendix for the SPDIF Connector's pin definitions.

Audio Extension Connector

The Audio Extension Connector allows you to connect other audio or video cards to your SB 32 audio card. With this connection, you will be able to listen to the sounds generated from another card through your audio card Refer to the "Hardware Information" appendix for the Audio Extension Connector's pin definitions.

IDE CD-ROM Data Connector

The IDE CD ROM Data Connector allows your audio card to be connected to an IDE CD-ROM drive. Refer to the CD-ROM drive's documentation for detailed instructions on how to install the CD-ROM drive

Jumpers

Jumpers are groups of pins that you can configure to define the hardware settings of your audio card (see Figure 1-3).

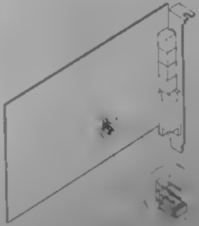


Figure 1-3 Jumpers

A jumper exists in two states enabled or disabled A jumper is enabled when a plastic hood called jumper block is placed over the jumper's two pins as shown in Figure 1-4

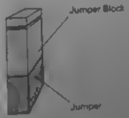


Figure 1-4 An enabled jumper

In contrast, a disabled two-pin jumper is one with no jumper block over it or one with a jumper block over one pin as shown in Figure 1-5.

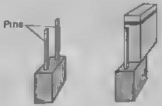


Figure 1-5 Two types of disabled jumpers

The rest of this chapter provides you with more information on the default hardware settings. If you wish to change these default settings, see the chapter "Changing Your Audio Card Settings".

Knowing the Hardware Settings

The jumpers found on your audio card in Figure 1-6 are mainly two-pin jumpers which are in the disabled or enabled state.

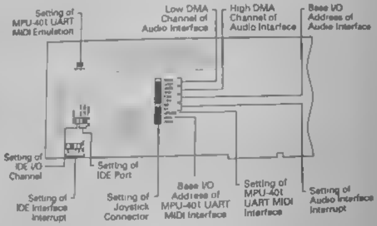

Setting of MPU-401 UART MIDI Emulation
Low DMA Channel of Audio Interface
High DMA Channel of Audio Interface
Base I/O Address of Audio Interface
Setting of IDE I/O Channel
Setting of IDE Port
Setting of IDE Interface Interrupt
Setting of Joystick Connector
Base I/O Address of MPU-401 UART MIDI Interface
Setting of MPU-401 UART MIDI Interface
Setting of Audio Interface Interrupt

Figure 1-6 The jumpers on your audio card

The ■ symbol on the audio card in Figure 1-6 indicates an enabled jumper.

The jumpers on the card allow you to define the following hardware settings:

- ☐ I/O Addresses
  - Base I/O Address of Audio interface
  - Base I/O Address of MPU-401 UART MIDI interface
- ☐ IRQ Lines
  - IRQ Line of Audio interface
  - IRQ Line of IDE CD-ROM interface
- ☐ DMA Channels
- ☐ Joystick Connector
- ☐ IDE Ports
- ☐ IDE I/O Channel
- ☐ MPU-401 UART MIDI Emulation
- ☐ Enabling/Disabling of MPU-401 UART MIDI Interface

I/O Addresses

I/O addresses (or I/O address range) are areas of memory used by your computer's microprocessor to distinguish among various peripheral devices connected to your system when sending or receiving data. There are several such devices on your audio card. These devices are listed in Table 1-1 with their factory default I/O addresses.

Table 1-1: I/O Address occupied by the Audio Card

I/O Address Range	Usage
200H to 207H	Game Port
220H to 22FH	Audio Interface
330H to 331H	MPU-401 UART MIDI Interface
388H to 38BH	FM Music Synthesizer
620H to 623H	Advanced WavEffects Synthesizer
A20H to A23H	Advanced WavEffects Synthesizer
E20H to E23H	Advanced WavEffects Synthesizer
1E8H to 1EFH	IDE Port (Tertiary)

The base I/O address is the starting address of the I/O address range. The factory default base I/O addresses of the interfaces are shown in Table 1-2.

Table 1-2. Base I/O Address Settings.

Interface	Base I/O Address
Audio	220H
MPU-401 UART MIDI	330H

You can change only the settings of the Audio and MPU-401 UART MIDI interfaces. The factory default base I/O address of Audio interface is 220H as shown in Figure 1-7.

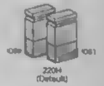


Figure 1-7

The factory default base I/O address of MPU-401 UART MIDI interface is 330H as shown in Figure 1-8.

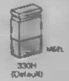


Figure 1-8

IRQ Lines

The IRQ (interrupt) line is the signal line your device uses to notify your computer's central processor that it wants to send or receive data for processing.

The jumpers IS0 and IS1 allow you to change the IRQ line setting of the Audio interface. The factory default setting is IRQ 5 as shown in Figure 1-9.

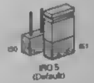


Figure 1-9

The IDE IRQ jumper allows you to change the IRQ line setting of the IDE CD ROM interface. The factory default setting is IRQ 11 as shown in Figure 1-10.

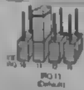


Figure 1-10

DMA Channels

The DMA (Direct Memory Access) channel is the signal line your device uses to transfer data directly to the system's memory. The Audio interface allows you to transfer data through Low or High DMA channel.

The jumpers DAS0 and DAS1 allow you to change the Low DMA channel setting of the Audio interface. The factory default setting is 1 as shown in Figure 1-11.

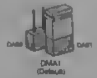


Figure 1-11

The jumpers DBS0 and DBS1 allow you to change the High DMA channel setting of the Audio interface. The factory default setting is 5 as shown in Figure 1-12.

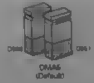


Figure 1-12

Joystick Connector

The JYEN jumper allows you to disable the joystick connector on your audio card if another joystick connector is already in use. The factory default setting is enabled as shown in Figure 1-13.

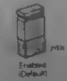


Figure 1-13

IDE Ports

Secondary, tertiary, and quaternary IDE ports are industry standard names for the combination of I/O addresses and IRQ line used by your IDE CD-ROM interface. For example, if your IDE CD-ROM interface uses a tertiary IDE port, then you would be using I/O addresses 1E8H to 1EFH in conjunction with IRQ 11.

The IDEIO0 and IDEIO1 jumpers allow you to configure your IDE port as secondary, tertiary, or quaternary port. Alternatively, you can also disable your IDE ports. The corresponding IRQ lines and I/O address ranges for each IDE port are shown in Table 1-3.

Table 1-3. IRQ Lines and I/O Address Ranges for the respective IDE port.

IDE Port	IRQ Line	I/O Address Range
Secondary	IRQ 15	170H to 177H, 376H to 377H
Tertiary	IRQ 11 or 12	1E8H to 1EFH
Quaternary	IRQ 10 or 11	168H to 16FH

The factory default setting is Tertiary as shown in Figure 1-14.

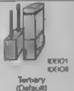


Figure 1-14

Only two devices can be attached to each IDE port in a system. Devices on the same IDE port use the same I/O addresses and IRQ line.

IDE I/O Channel

The IOCHRDY jumper allows you to enable or disable the I/O channel between your computer's central processor and the IDE CD-ROM drive. The factory default setting is disabled as shown in Figure 1-15.

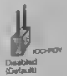


Figure 1-15

MPU-401 UART MIDI Emulation

The MFBEN jumper allows you to enable or disable the MIDI Emulation feature. This feature allows most real mode games, which do not support wave table synthesis, to play wave table music from the audio card. The MIDI output from the games is directed to the wave table music synthesizer rather than the MPU-401 interface. Games that have not been designed to use the wave table synthesis features on your card can now use them. Note that you also need to install the AWEUTIL software for MIDI Emulation to function properly. (For more information, refer to the "AdvancedWavEffects Utility" chapter in your card's *User's Guide*.)

Protected mode software does not support MIDI Emulation. You can still play music from this type of software using the 4-operator synthesizer chip.

The factory default setting is enabled as shown in Figure 1-16. To change this setting, see the chapter "Changing Your Audio Card Settings".

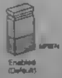


Figure 1-16

Enabling/Disabling of MPU-401 UART MIDI Interface

The MPUEN jumper allows you to enable/disable your audio card's MPU-401 UART MIDI interface. The factory default setting is enabled as shown in Figure 1-17.

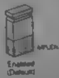


Figure 1-17

2

Setting Up Your Audio Card

This chapter guides you through the process of installing and testing your audio card in your system. It is organized as follows

- ☐ Checking the Hardware Settings
- ☐ Installing the Card
- ☐ Connecting External Speakers and Other Devices
- ☐ Connecting CD-ROM Drive
- ☐ Installing the Software
- ☐ Testing the Installation
- ☐ Optimizing the Memory Usage

Checking the Hardware Settings

Before you install your audio card in your system, you should take note of the following factory default settings of the card

Audio Interface

I/O address range	220H to 22FH
IRQ line	IRQ 5
Low DMA channel	1
High DMA channel	5

Game Port

Status	Enabled
I/O address range	200H to 207H

MPU-401 UART MIDI Interface

Status	Enabled
I/O address range	330H to 331H

FM Music Synthesizer Chip

I/O address range	388H to 38BH

Advanced WavEffects Synthesizer Chip

I/O address ranges :	620H to 623H A20H to A23H E20H to E23H

IDE CD-ROM Interface

Status	Enabled
Port	Tertiary
I/O address range :	1E8H to 1EFH
IRQ line	IRQ 11

You will need to change the factory default settings of your audio card or another peripheral device on your system if any of the following occurs:

- ❑ Advanced 32-bit operating system like OS/2 Warp, Windows NT, and Windows 95 is installed in your system. In this case, change your IDE port to Secondary
- ❑ A peripheral device uses the same I/O addresses, DMA channel, or IRQ line setting as your card (known as a hardware conflict).
- ❑ Another Joystick/Game Connector in your system is already in use.

We advise you not to change your audio card's default settings unless you have a hardware conflict. If you need to change the base I/O address, you should do so before installing the card in your system. See the chapter "Changing Your Audio Card Settings" if you need to change the other settings.

However, if you are unfamiliar with the settings of other devices on your system, we recommend that you accept all the factory default settings of your card.

Installing the Card

Installing the audio card in your system is simple, so please follow the instructions carefully.

To install the card,

1. Switch off your system and all peripheral devices. Unplug the power cord from the wall outlet.

   The power cord and wall outlet shown may be different in your country

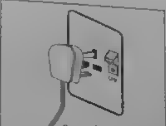


Figure 2-1

2. Touch a metal plate on your system to ground yourself and discharge any static electricity.

Figure 2-2

3. Remove the cover from your system.

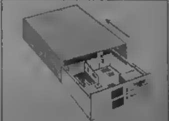


Figure 2-3

Installing from the Diskette

For your Windows applications to be successfully installed, you need to have Windows 3.1 in your system.

To install from the diskette:

1. Insert your package's installation diskette into disk drive A or B of your computer.
2. At the DOS prompt, type **A:INSTALL** (or **B:INSTALL**) and press <Enter>.
3. Follow the instructions on the screen to complete the installation.

Installing from the CD-ROM

Before you install from the Creative's software CD-ROM, check that your CD-ROM drive and drivers are installed properly (For more information, refer to your CD-ROM Drive User's Guide.)

For your Windows applications to be installed successfully, you need to have Windows 3.1 in your system.

To install from the CD-ROM:

1. Change to the directory of your CD-ROM drive.
2. Place the CD-ROM into your CD-ROM drive.
3. Type **INSTALL** and press <Enter>.
4. Follow the instructions on the screen to complete the installation.

Read the README file in the Creative's software CD-ROM for more information.

Understanding the Installation Program

The installation program creates a directory you specify and copies the software provided in it. It then allows you to set up your Windows applications by adding a command to the WIN.INI file to run WINSETUP.EXE. This command automatically creates the audio card group window and the necessary icons when you next run Windows.

You can also choose to set up your Windows applications and drivers at a later time by running INSTALL from the sound directory in your hard disk.

The AUTOEXEC.BAT File Settings

The installation program adds the following statements to the AUTOEXEC.BAT file.

```
SET BLASTER=A220 I5 D1 H5 P330 E620 T6
SET SOUND=C:\SB16
SET MIDI=SYNTH:1 MAP:E MODE:0
C:\SB16\DIAGNOSE /S
C:\SB16\AWEUTIL /S
C:\SB16\SB16SET /P /Q
```

Refer to "Setting Environment Variables" in the chapter "Changing Your Audio Card Settings" for more information on the SOUND, BLASTER, and MIDI environment settings.

CTSB16.SYS and CTMMSYS.SYS are low-level device drivers that provide wave playback and recording for DOS applications like:

- ☐ Creative's **PLAY.EXE** and **RECORD.EXE** (provided with the package)
- ☐ Third-party DOS applications developed with Creative's Sound Blaster Developer Kit. These applications work with drivers (such as CTWDSK.DRV, CTWMEM.DRV, CTVDSK.DRV, and CT-VOICE.DRV) that require the low-level drivers. The drivers are found in the DRV subdirectory of your sound directory.

These drivers use a substantial amount of memory when loaded; memory which may be required by some programs that use a large amount of conventional memory. In general, you will not need these drivers if you run Windows applications or play DOS games. However, you need these drivers to run DOS applications like PLAY.EXE and RECORD.EXE.

If you do not want to load these drivers, choose the "Default Installation" option. If you want to load these drivers, choose the "Custom Installation" option and select to add the following statements to your CONFIG.SYS file:

```
C:\SB16\DRV\CTSB16.SYS /UNIT=0 /BLASTER=A:220 I:5 D:1 H:5
C:\SB16\DRV\CTMMSYS.SYS
```

If you need the low-level device drivers for your software application later, you can load them into memory by typing **DIAGNOSE /A** at the DOS prompt and pressing <Enter>. This command adds the required statements to the CONFIG.SYS file.

Please also refer to "Optimizing the Memory Usage" in this chapter on how to optimize your memory after you have loaded the low-level drivers.

Testing the Installation

After you have installed the software, run the test program DIAGNOSE to ensure the card has been installed properly. This program checks the base I/O address, DMA channel, and IRQ line used by the audio card. It then displays a menu that allows you to test the audio card's music and sound outputs.

To run the test program:

1. Change to your sound directory (e.g., C:\SB16).
2. Type **DIAGNOSE** and press <Enter>.
3. Follow the instructions on the screen to complete the test.

If the test program stops or displays an error message when it is checking the Audio interface's base I/O address, IRQ line, or DMA channel, it may be due to a conflict between the audio card and another peripheral device. To resolve the conflict, refer to the "Changing Your Audio Card Settings" chapter or the "Troubleshooting" appendix for more information.

If there is no sound output, check the following:

- ☐ Speakers are connected to the card's Speaker Out jack and its volume set at mid-range (if there is a volume control knob).
- ☐ External amplifier is connected to the card's Line Out jack if you decide not to use the card's internal power amplifier.
- ☐ No hardware conflicts between the audio card and another peripheral card.

The built-in stereo power amplifier has a maximum output of four watts per channel for four ohm speakers and two watts per channel for eight ohm speakers. Do not play at maximum volume if your speakers cannot handle this power.

Optimizing the Memory Usage

Before you embark on loading CTSB16.SYS and CTMMSYS.SYS into memory, you should firstly consider whether you actually need these drivers to run your software. If you do, we recommend that you load them into high memory (e.g., using memory managers) to maximize your memory usage.

If you do not need these drivers (e.g., if you are running Windows applications or playing DOS games only), you can bypass the loading of these drivers.

Using Memory Managers

You can use one of the following memory managers

- ❑ If you use Microsoft DOS 6.x, run MEMMAKER to optimize the memory. (Please refer to the DOS 6.x documentation for instructions on how to use the MEMMAKER.)
- ❑ If you have a memory manager like QEMM or 386MAX, please refer to the respective software's documentation for instructions on how to optimize the memory and load the drivers into high memory

Bypassing the Loading of Low-Level Drivers

If you have not installed the low-level device drivers, please skip this section

You may bypass the loading of low-level drivers in one of the following ways

- ❑ Using the DOS 6.x's multiple boot sessions With this feature, several sessions can be made available for selection during bootup. One session can contain settings that load the drivers into memory. When you do not wish to load these drivers into memory, you can select another session that allows you to boot up the system without these drivers. (Please refer to your DOS 6.x documentation for instructions on how to create the multiple boot sessions.)
- ❑ Using the Bypass Installation feature of the low-level device drivers. During system startup, simply press and hold down the <Alt> key after the RAM test

3

Changing Your Audio Card Settings

This chapter shows you how to change the hardware and software-configurable settings, as well as the environment variables of your audio card. Refer to this chapter if you want to find out more about the various settings of your audio card

In this chapter, you will know more about the following to make the necessary changes

- ❑ Jumpers on your audio card and the hardware settings you can use
- ❑ Configuration Utilities—DIAGNOSE and SBConfiguration, and how to run these utilities to change the software-configurable settings
- ❑ Environment variables SOUND, BLASTER and MIDI, and how to change these variables' specifications in memory

As many applications are designed to work with your audio card's default settings, you should not change the settings unless it is absolutely necessary (e.g., resolving hardware conflicts)

A Closer Look at Your Hardware Settings

If you intend to change the hardware settings of your audio card, you should first become more familiar with the jumpers on the card shown in Figure 3-1.

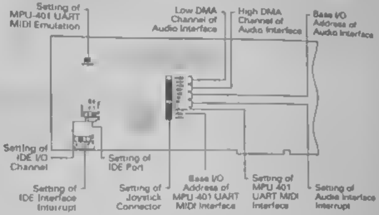

Setting of MPU-401 UART MIDI Emulation
Low DMA Channel of Audio Interface
High DMA Channel of Audio Interface
Base I/O Address of Audio Interface
Setting of IDE I/O Channel
Setting of IDE Port
Setting of IDE Interface Interrupt
Setting of Joystick Connector
Base I/O Address of MPU-401 UART MIDI Interface
Setting of MPU 401 UART MIDI Interface
Setting of Audio Interface Interrupt

Figure 3-1 Jumpers on the audio card

In this manual, the disabled and enabled jumpers are represented using blocks as shown in Figure 3-2

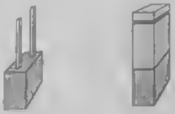


Figure 3-2 Representation of disabled (left) and enabled (right) jumpers

Changing Configuration of Jumpers

Jumper configurations define the hardware settings of the audio card Before you actually change a jumper configuration, you should identify the current and the proposed new setting You can then proceed to change the jumper configuration

To change the configuration of jumpers

1. Switch off your computer and all other peripheral devices
2. Remove the system's cover and card from your system
3. Identify the jumpers to change
   For more information on how to identify the jumpers, refer to Figure 3-1.
4. Remove the jumper blocks from the jumpers as shown in Figure 3-3

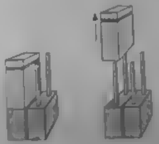


Figure 3-3 Removing the Jumper Block

5. Select the settings for the card by placing the jumper blocks on the desired jumpers as shown in Figure 3-4

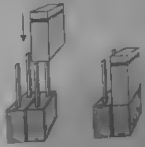


Figure 3-4 Installing the Jumper Block

Changing the Settings of Audio Interface

This section describes the following Audio interface's settings and shows you how to change them.

- ☐ Base I/O Address
- ☐ IRQ Line
- ☐ DMA Channel

Please ensure that the above settings on your card match the corresponding software settings.

Changing the Base I/O Address

Four base I/O addresses are available for the Audio interface: 220H (factory default setting), 240H, 260H, and 280H. Each one determines an I/O address range of the Advanced WavEffects synthesizer chip

These base I/O address settings with their I/O address range are shown in Table 3-1.

Table 3-1: I/O Addresses (Audio Interface).

Base I/O Address	I/O Address Range	Advanced WavEffects Synthesizer
220H (Default)	220H to 22FH	620H to 623H A20H to A23H E20H to E23H
240H	240H to 24FH	640H to 643H A40H to A43H E40H to E43H
260H	260H to 26FH	660H to 663H A60H to A63H E60H to E63H
280H	280H to 28FH	680H to 683H A80H to A83H E80H to E83H

To change the base I/O address, enable the jumpers corresponding to the setting shown in Figure 3-5.

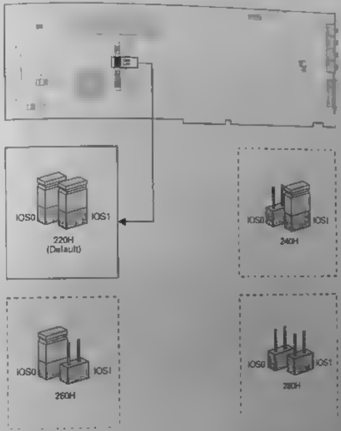


Figure 3-5 The available base I/O address settings of the Audio interface

Changing the IRQ Line

Four IRQ lines are available for the Audio interface: IRQ 2, 5 (factory default setting), 7, and 10. The IRQ line setting can be changed using jumpers IS0 and IS1. To change the IRQ line, enable the jumpers corresponding to the setting shown in Figure 3-6.

Your IRQ line is also software-configurable. See "Running the Configuration Utilities" in this chapter to change the IRQ line setting.

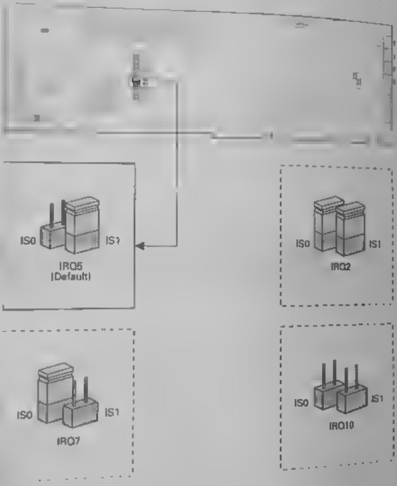


Figure 3-6 The available IRQ line settings of the Audio interface

Changing the DMA Channel

Your Audio interface supports both Low and High DMA channels for direct data transfer to the system's memory. Low DMA channels 0, 1 (factory default setting), and 3 are used to transfer 8-bit data. Your Low DMA channel setting can be changed using jumpers DAS0 and DAS1. To change this DMA channel, enable the jumpers corresponding to the setting shown in Figure 3-7.

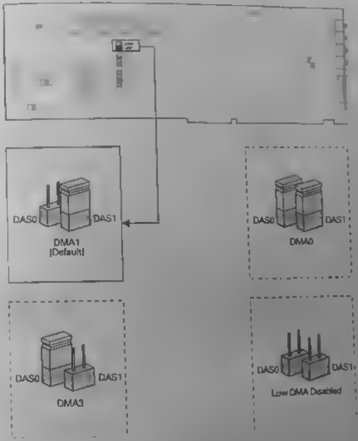


Figure 3-7 The available Low DMA channel settings of the Audio interface

High DMA channels 5 (factory default setting), 6, and 7 are used to transfer 16-bit data. Your High DMA channel setting can be changed using jumpers DBS0 and DBS1. To change this DMA channel, enable the jumpers corresponding to the setting shown in Figure 3-8.

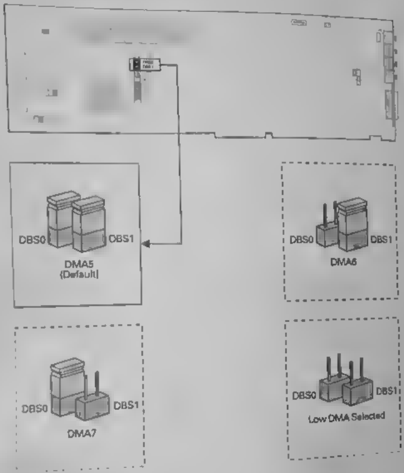


Figure 3-8 The available High DMA channel settings of the Audio interface

Your DMA channels are also software-configurable. See "Running the Configuration Utilities" in this chapter to change the High and Low DMA channels' settings.

Changing the Settings of MPU-401 UART MIDI Interface

This section describes the following MPU-401 UART MIDI interface's settings and shows you how to change them:

- ☐ Base I/O Address
- ☐ MIDI Emulation
- ☐ Enabling/Disabling of the interface

For base I/O address, please ensure that its setting on your card matches the corresponding software setting.

Changing the Base I/O Address

Two base I/O addresses available for the MPU-401 UART MIDI interface are selectable using jumper MSEL. These settings with their I/O address ranges are shown in Table 3-2.

Table 3-2: I/O Addresses (MPU-401 Interface).

Base I/O Address	I/O Address Range
300H	300H to 301H
330H (Default)	330H to 331H

To change the base I/O address, enable the jumper corresponding to the setting shown in Figure 3-9.

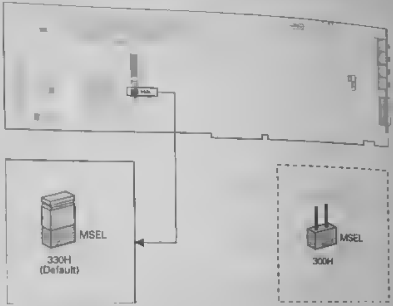


Figure 3-9 The available base I/O address settings of MPU-401 UART MIDI interface

Enabling/Disabling MIDI Emulation

With AWEUTIL software installed, the MPU-401 UART MIDI Emulation mechanism on your audio card can be enabled/disabled using jumper MFBEN. The factory default setting is enabled. To change the setting, enable or disable jumper MFBEN as shown in Figure 3-10.

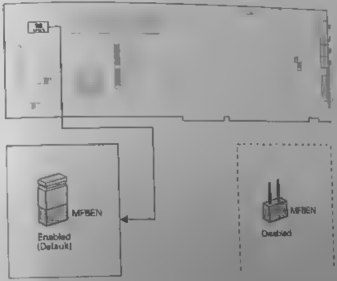


Figure 3-10 The available MPU-401 UART MIDI Emulation settings

Enabling/Disabling Your MIDI Interface

Your audio card's MPU-401 UART MIDI interface can be enabled/disabled using jumper MPUEN. The factory default setting is enabled. To change the setting, enable or disable jumper MPUEN as shown in Figure 3-11.

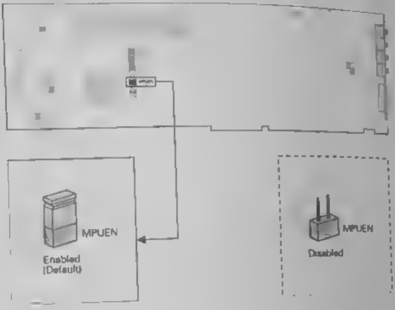


Figure 3-11 The available MPU-401 UART MIDI interface settings

Running the Configuration Utilities

When you change the settings of Audio and MPU-401 UART MIDI interfaces, you need to update the system files—AUTOEXEC.BAT, CONFIG.SYS, and SYSTEM.INI— with the new settings. DIAGNOSE and SBConfiguration are two programs that allow you to do this in DOS and Windows respectively.

To run DIAGNOSE:

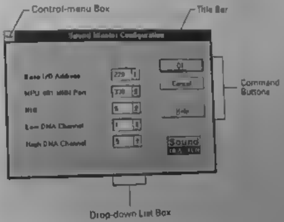
1. Change to your sound directory (e.g., C:\SB16).
2. Type **DIAGNOSE** and press <Enter>.
3. Follow the instructions on the screen.

If you run DIAGNOSE with the /S switch, it reads the BLASTER environment for the settings on the card and programs the card with those settings. Take note that it does not modify your system files. You can also put DIAGNOSE /S after the SET BLASTER entry in the AUTOEXEC.BAT file if you do not want to load CTSB16.SYS during bootup.

DIAGNOSE also tests the audio output (see the chapter "Setting Up Your Audio Card").

To run SBConfiguration.

1. Double-click the SBConfiguration icon in the audio card's group window
   The Sound Blaster Configuration dialog box similar to Figure 3-12 appears.



Base I/O Address 220
MPU-401 MIDI Port 330
IRQ 5
Low DMA Channel 1
High DMA Channel 5

Figure 3-12 The Sound Blaster Configuration dialog box

2. Select the desired settings from the available drop-down list boxes.
3. To save the new settings, choose **OK**.
   To quit without saving the new settings, choose Cancel.

When prompted to select the base I/O addresses of Audio and MPU-401 UART MIDI interfaces, you should select the ones that match those on the card. Remember to reboot your system for the changes to take effect.

Changing the Settings of IDE CD-ROM Interface

This section describes the following IDE CD-ROM interface's settings on your card and shows you how to change them:

- ☐ IDE Port
- ☐ IRQ Line

To ensure that your changes to the IDE CD-ROM interface settings are effected, make corresponding changes to the hardware device driver settings also. For more information, refer to the documentation provided with your CD-ROM drive.

Changing the IDE Port

Three IDE ports are available for your audio card, secondary, tertiary (factory default setting), and quaternary. See Table 3-3 for the different I/O address ranges available. If you change your IDE port, you may also need to change the IRQ line setting for your IDE CD-ROM interface. (Read "Changing the IRQ Line" in the next section for more information.) Alternatively, you can disable the IDE CD-ROM interface.

Table 3-3: I/O Addresses (IDE CD-ROM Interface).

IDE Port	I/O Address Range
Secondary	170H to 177H, 376H to 377H
Tertiary (Default)	1E8H to 1EFH
Quaternary	168H to 16FH

To connect your IDE CD-ROM drive to the tertiary or quaternary port, your CD-ROM drive's device driver must be able to support these ports. Refer to the documentation provided with your CD-ROM drive for more information.

To change the port, enable the jumpers corresponding to the setting shown in Figure 3-13.

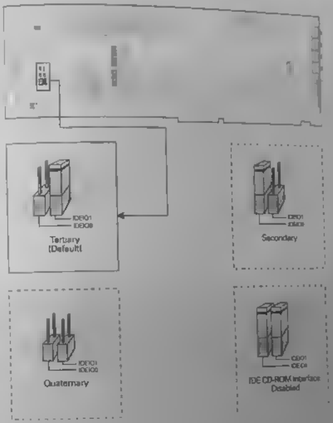


Figure 3-13 The available IDE port settings for the IDE CD-ROM interface

Changing the IRQ Line

Four IRQ lines are available for your IDE CD-ROM interface: IRQ 15, 10, 11 (factory default setting), and 12. The IDE IRQ setting is dependent on the IDE port you select. Table 3-4 shows the IDE IRQ line settings for the respective IDE port.

Table 3-4: IRQ Line Settings for the respective IDE Port.

IDE Port	IRQ Lines
Secondary	15
Tertiary (Default)	11 (Default) or 12
Quaternary	10 or 11

Refer to the section "Changing the IDE Port" to identify the IDE port you have specified.

To change the IRQ line, enable the jumpers corresponding to the setting shown in Figure 3-14.

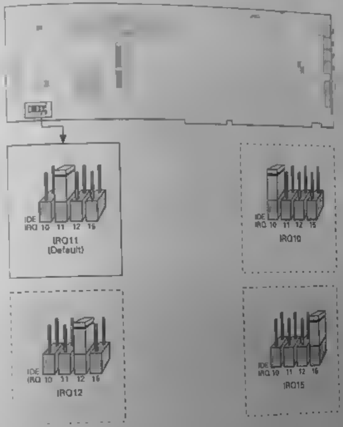


Figure 3-14 The available IRQ settings of your IDE CD ROM interface

To ensure that your changes to the IDE CD ROM interface settings are effected, make corresponding changes to the hardware device driver settings also. For more information, refer to the documentation provided with your CD-ROM drive

Changing the Setting of Joystick Connector

The Joystick Connector on the audio card can be enabled or disabled using jumper JYEN. The factory default setting of the Joystick Connector is enabled.

To change the Joystick Connector setting, enable or disable jumper JYEN as shown in Figure 3-15.

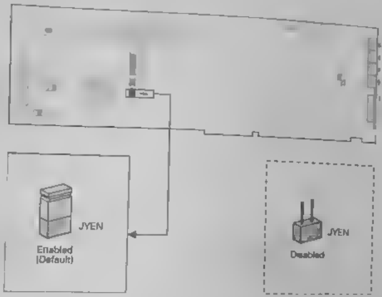


Figure 3-15 The available Joystick Connector settings.

If there is a game card in your system, it will conflict with the joystick connector on your audio card. To avoid the conflict, remove either the game card or disable the joystick connector on your audio card by removing the jumper block from jumper JYEN.

Setting Environment Variables

In order for your audio card to work, its environment variables must be specified in your system during bootup. This is done by setting three environment variables SOUND, BLASTER, and MIDI in memory. These variables are described below.

⚠ During installation, the installation program has set up these environment variables in your AUTOEXEC.BAT and CONFIG.SYS files. You should not change these default settings unless it is absolutely necessary (e.g., settings in BLASTER environment variable differ from the default settings).

SOUND Environment Variable

The SOUND environment variable specifies the directory location of your audio card's drivers and software. The command for setting the SOUND environment variable is as follows:

```
SET SOUND=path
```

where *path* is the drive and directory of your audio card's software (e.g., C:\SB16).

There is no space before and after the equal sign.

BLASTER Environment Variable

The BLASTER environment variable specifies the base I/O address, IRQ line, and DMA channel hardware configurations of your audio interface. The command for setting the BLASTER environment variable is as follows:

```
SET BLASTER=A220 I5 D1 H5 P330 E620 T6
```

There is no space before and after the equal sign, but there must be at least one space between two settings.

The settings for the parameters in the command are described below.

Parameter	Description
Axxx	Specifies the audio interface's base I/O address. xxx can be 220, 240, 260, or 280
Ix	Specifies the IRQ line used by the audio interface. x can be IRQ 2, 5, 7, or 10.
Dx	Specifies the Low DMA channel used by the audio interface. x can be 0, 1, or 3.
Hx	Specifies the High DMA chancel used by the audio interface. x can be 5, 6, or 7.
Pxxx	Specifies the MPU-401 UART MIDI interface's base I/O address. xxx can be 300 or 330.
Exxx	Specifies the Advanced WavEffects chip's base I/O address. xxx can be 620, 640, 660, or 680.
Tx	Specifies the card type. x must be 6

MIDI Environment Variable

The MIDI environment variable specifies the MIDI file format used and where the MIDI data is sent to. The MIDI data can be sent to music chips or through the MIDI port to external MIDI devices

Generally, there are three MIDI file formats available in the market. General MIDI, Extended MIDI, and Basic MIDI The command for setting the MIDI environment variable is as follows.

```
SET MIDI=SYNTH:x MAP:x MODE:x
```

The parameters of the command are described below

Parameter	Description
SYNTH:x	x can be 1 (for internal synthesizer) or 2 (for MIDI port). The default for x is 1.
MAP:x	x can be G (for General MIDI file format), E (for Extended MIDI file format), or B (Basic MIDI file format). The default for x is E.
MODE:x	x can be 0 (for General MIDI mode), 1 (for General Standard mode), or 2 (for MT-32 mode) The default for x is 0. Please note that General Standard and MT-32 modes are supported only when the SIMM RAM is inserted.

A

General Specifications

This appendix lists the general specifications of your audio card

Advanced WavEffects 32 Music Synthesizer

- ☐ 32-voices polyphony.
- ☐ 16 parts multi-timbral
- ☐ 1 MB ROM of General MIDI sample

FM Music Synthesizer

- ☐ 4-operator, 11-voice or 2-operator, 20-voice FM synthesis
- ☐ Compatible with previous Sound Blaster and Adlib FM chip

Stereo Digitized Voice Channel

- ☐ 16-bit and 8-bit digitizing in stereo and mono modes
- ☐ Programmable sampling rate, 5 kHz to 45 kHz in 228 linear steps
- ☐ High and Low DMA channels using a single interrupt
- ☐ Dynamic filtering for digital audio recording and playback

Built In Digital/Analog Mixer

- ☐ Mixes sources from Digitized voice and inputs from MIDI devices, CD-audio, Line-in, Microphone and PC Speaker
- ☐ Selectable input source or mixing of various audio sources for recording.

The CD Audio Connector has the following pin assignments as shown in Table B-2.

Table B-2: CD Audio Connector Pin Assignments.

CD Audio Connector		
Pin	**Signal**	**I/O**
1	CD Left Channel	IN
2	Ground	IN
3	Ground	IN
4	CD Right Channel	IN

If you want to locate the CD Audio Connectors on the audio card, see Figure 1-2.

PC Speaker Connector Pin Assignments

The PC Speaker Connector has the following pin assignments as shown in Table B-3.

Table B-3: PC Speaker Connector Pin Assignments.

PC Speaker Connector		
Pin	**Signal**	**I/O**
1	+5V	IN
2	PC Speaker Out	IN

If you want to locate PC Speaker Connector on the audio card, see Figure 1-2

SPDIF Connector Pin Assignments

The SPDIF Connector has the following pin assignments as shown in Table B-4.

Table B-4: SPDIF Connector Pin Assignments.

SPDIF Connector		
Pin	**Signal**	**I/O**
0	Digital Out	OUT
1	Ground	OUT

If you want to locate SPDIF Connector on the audio card, see Figure 1-2.

Audio Extension Connector Pin Assignments

The Audio Extension Connector comprises JP 23, JP 24, and JP 25. It has the following pin assignments as shown in Tables B-5 to B-7

If you want to locate Audio Extension Connector on the audio card, see Figure 1-2

Table B-5: Audio Extension Connector Pin Assignments for JP 23.

Audio Extension Connector (JP 23)	
Pin	**Description**
1	Speaker output. Ground
2	Speaker output. Right channel
3	Speaker output. Left channel
4	Speaker output return signal. Left channel
5	Speaker output return signal: Right channel

Installing DOS-based games

Most game installation programs can detect the type of sound card found in your system and automatically configure the game to work well with your sound card. But if you need to do a manual setup, please select "AWE32" or "SB16" (if the option for "AWE32" is not available) as your card type, since all our sound cards are backward compatible.

For example, if you are installing a game called Descent Destination Saturn (see Figure 1 below), then you can either let the setup program auto-detect the sound hardware or choose "Change Digital Sound Card" to see what options are available. In the second case, you will find that the program puts AWE32 and SB16 together. So, all you have to do is simply select "Sound Blaster 16/AWE32" as your card.

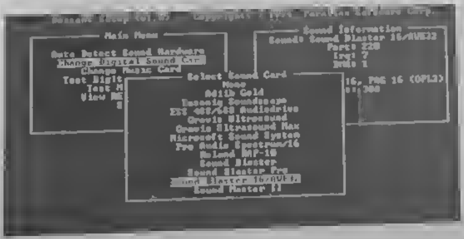


Figure 1 Choosing the card type for your SB32

Upgrading to full AWE32 features

You can also upgrade your SB32 to support more advanced AWE32 features — such as Emu Systems' SoundFont technology and GS/MT32 music standards. To do this, simply insert SIMM modules into the two 30-pin memory expansion slots found on the card (see Figure 2 below).

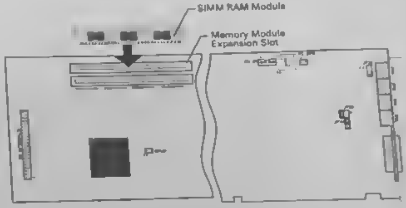
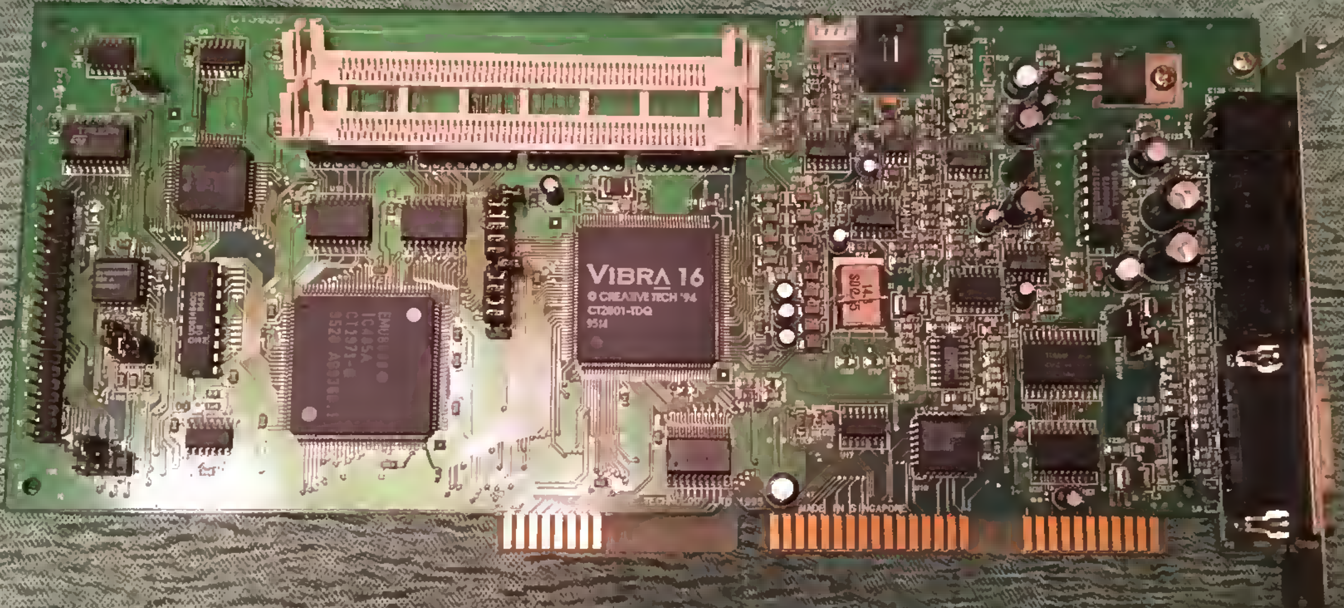


Figure 2 Adding a SIMM module to your card

The upgrade combinations available include:
(1) Two 1MB RAM modules,
(2) Two 4MB RAM modules, and
(3) Two 16MB RAM modules.

Please use SIMMs with an access time of under 80 ns. And note that for both SB32 and AWE32, the maximum downloadable SoundFont file size is actually 28MB


VIBRA 16
© CREATIVE TECH '94
CT2501-TDQ
9514
EMU8000
CT1971
MADE IN SINGAPORE